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Hon A Felch

MEMORIAL

OF THE

IRON MANUFACTURERS

OF

NEW ENGLAND.

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MEMORIAL

OF THE

IRON MANUFACTURERS

OF

NEW ENGLAND,

ASKING FOR

A MODIFICATION

OF THE

TARIFF OF 1846.

PREPARED BY JOHN L. HAYES,

OF THE KATAHDIN IRON WORKS, MAINE.

PHILADELPHIA:
C. SHERMAN, PRINTER.
1850.

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MEMORIAL.

TO THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED.

THE undersigned, manufacturers of iron in New England, respectfully invite your attention to the state of their suffering industry, and request you to adopt some policy which shall at the same time benefit the consumer of iron, protect and encourage the producer, and increase the amount and stability of the revenue.

We beg leave to present the following facts and statements in proof that such a policy is demanded, and that its adoption will secure one of the most important elements of our national prosperity.

We will barely allude to the national importance of this industry. The value of the whole production of iron in the world has been estimated to be ten times that of gold and silver, and one half the value of all the metals produced from the earth. While gold is but the measure of wealth, iron is the instrument with which wealth is created. It is the sword, the axe, the ploughshare, the anchor, the loom, the railtrack, the steam-engine. Iron is the basis of the world's material prosperity, and the civilization of different nations is remarkably proportioned to its production and consumption. The reason for this is obvious, when we

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remember, the state of every mechanical art is determined by the perfection and number of tools in use, or, in other words, the application of iron by the artisan. Great Britain consumes 100 pounds for each person of her population. Belgium, whose agriculture is unsurpassed by that of any other country, consumes 100 pounds to each individual. The United States consumed nearly that amount in 1847, the year of their greatest prosperity. France consumes about 30 pounds; Russia 4 pounds. In other nations, the consumption decreases according to the state of their civilization, until we come to the savage nations, who point their arrows with flint and bone.

Karsten, the classic German writer upon Metallurgy, remarks: "The preparation of iron has become the most essential branch of industry, by the immediate benefit it gives to the producer, the general benefits it yields to society, and the advantages it offers to governments. No other occupies so many hands, produces so active and constant a circulation of money, or exerts so direct an influence upon the wealth of the state and the comfort of the people. It is the particular interest of every government to favour it, to sustain it by the most efficacious measures, and to apply such administrative dispositions as will carry it to the highest degree of prosperity."

A distinguished French savant, in speaking of this industry, says: "Of all the tendencies which occupy different civilized nations, the most marked is that of fixing upon their own territory all those branches of industrial activity which suit its soil, climate, and commercial position. And that government will most preserve the respect of neighbouring nations, and show itself worthy of the respect of its people, which shall use all its means of action to favour with discernment this tendency."

These views have been cordially embraced by the leading governments of Europe. Great Britain has nourished the manufacture of iron upon her soil with zealous care. All

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attempts to place imposts upon iron have failed. The duties on iron from 1780 to 1820, were advanced fifteen times, without a single reduction, having been increased from 2*l.* 10*s.* to 7*l.* per ton. And when her manufacturers could defy the world, and not till then, she commenced that free trade policy which enables her manufacturers to command the markets of the world.

France, Russia, Prussia, Austria, have not only protected their iron manufactures by high duties on foreign iron, but have given high bounties for inventions and improvements, have established schools of mines for instruction of masters of forges, have provided accomplished engineers of mines at the government expense to superintend the construction and improvement of works, and have sent commissions of metallurgists into foreign countries, to study and report to the people any improvement in the metallurgical arts.

We maintain, therefore, that it is no assumption in us, to claim that the condition of our industry, whether as affecting the supply for consumption, the benefit to the producer, or the means of making us independent of foreign nations for the supply of the most important material of labour, is a matter of great national concern, and demands the serious attention of our legislators.

We will first call your attention to the condition of our industry, as it directly or remotely affects the consumer. Our consumption of iron in 1848 was about one million of tons. Of this amount we produced, according to the best estimates, about 800,000 tons. The United States ranked then as the second iron producing country in the world. From 1821 to 1829 inclusive, our consumption was only 25 pounds to each individual of our population, having quadrupled in twenty years. If the ratio of consumption should continue to increase, which it must do, unless all our industrial activity should be checked, it becomes an important question to the consumer how this demand is to be supplied.

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He will at once see, if he looks around, that the means of supply in this country are rapidly diminishing. The British manufacturer, supported by capital accumulated during a long period of prosperity, by low interest of money, cheap labour, and more than that, labour entirely under his control, and by a system of revenue which floods this country with his products, when we are least able to compete with him, has broken down our market. Of the fifteen rolling-mills erected in this country for the manufacture of rails, only two are in operation, to supply a local and limited demand. Thus the market for our forge pig is destroyed. Our foundries are glutted with the cheap Scotch iron. There is, therefore, no demand for our foundry iron for castings. Eight furnaces in New England and on Lake Champlain, which produced annually fifteen thousand tons of charcoal iron have already stopped. Those which are now in blast, are running only to use up their stocks of coal and ore on hand. As the principal item in the cost of the production of charcoal iron, is the combustible, it is better to put it into the imperishable form of iron. The materials for making iron are generally supplied by long contracts, so that the iron-master may be compelled to make iron even at a large loss. In some cases owners have paid large sums to contractors to give up their jobs. We have no hesitation in saying that the whole production of Lake Champlain and New England, which has equalled nearly forty thousand tons, a quantity equal to half the production in Sweden in 1825, and the whole production in Great Britain at the time of the Revolution, must be inevitably cut off. It would even now be entirely suspended, if owners were not compelled to continue their work by the causes I have indicated, and perhaps the hope that Congress may change the system of revenue, by the operation of which they are now suffering. In the valley of the Housatonic, where there are eighteen blast furnaces, all cutting of wood for the supply of charcoal has been suspended.

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That the ruin of the charcoal establishments, if the present revenue system is continued, is inevitable, will be seen by looking at the following statements of the cost of making iron at two establishments, which are selected as average examples, in the two most important iron districts of the North.

The first is a modern establishment, well located, and conducted with extraordinary skill, as the remarkable production shows. The make is probably greater than that of any other charcoal furnace in the country.

The second is an older establishment, and the aim of the manufacturer is quality not quantity. The iron produced is unsurpassed by any in this country, and perhaps in the world.

COST OF MAKING IRON AT A FURNACE ON LAKE CHAMPLAIN.

Quantity of iron made from October 1st, 1847, to October 1st, 1848, - - - - - - 3,017 gross tons.

AMOUNT OF STOCK USED.

603,400 bushels of charcoal, at 6½ cents per bushel,	39,220	00
6,034 tons of ore, at $1 00 per ton, - - -	6,034	00
200 tons of clay, at $2 00 per ton, - - -	400	00
800 tons of limestone, at $1 00 per ton, - -	800	00
200 tons of pigbed sand at 50 cents, - -	100	00
	$46,554	00

Cost of the above stock per ton of iron, - -	$15	43
Labour in manufacturing pig-iron, - - -	3	00
Repairs of ~~iron~~ furnace - - - - - -	1	00
Agent, bookkeepers, managers, &c., - - -	1	18

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Brought forward, - - - - -	$20 61
Insurers and taxes, - - - - - -	25
Transport to market, - - - - - -	3 25
Interest on $50,000 fixed capital, at 10 per cent.,	1 67
Wharfage, weighing, &c., - - - - -	50
Interest for one year on $26 28, the sum of the above items, being the cost of the iron in market, including six months' time given to purchasers,	1 84
Commissions on sales, - - - - -	1 40
Cost of iron per ton, - - - - - -	$29 52

The highest price offered at market is $22 50! The furnace has 3,000 tons on hand. If the iron were sold at present prices, there would be a loss to the manufacturer of $21,000.

COST OF MAKING "SALISBURY" IRON AT CORNWALL, CONNECTICUT, IN THE VALLEY OF THE HOUSATONIC.

Amount of fixed capital, - - - -	$10,000
Quantity of iron made in a year, the average time in blast being ten months, - - - -	1,200 gross tons.

ITEMS OF COST OF ONE TON OF IRON.

225 bushels of charcoal, at $7 00 per hundred bushels,	$15 75
3 tons of ore, at $4 25, - - - - -	12 75
⅓ ton of limestone, at $1 50 - - - -	50
Labour, - - - - - - - - -	3 00
General expenses, repairs, &c., estimated at -	1 00
Interest on fixed capital, - - - - -	50
Interest on cost of iron, including six months' time to purchasers, - - - - - - - - -	99
	$34 49

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The cost of making iron at eight or ten furnaces in the valley of the Housatonic, does not differ materially from the above estimate. "The highest price talked of for this iron is $28 00." The whole quantity now on hand in that district could be bought for that price. It would bring no more in New York, although it would cost $3 50 to transport it. The price of the Salisbury iron has always been, until lately, from $35 00 to $40 00 at the furnace." The owner of the last-named furnace, says: "We are now in blast, shall soon have used up our stock procured last year, and then we dismiss our hands for ever, unless there should be some better inducements than there now are for operations. We are having no stock whatever prepared for the future, consequently could not make iron, however favourable it might be the coming year, as our stock must be provided for one year, at least, ahead."

The same causes which depress the iron manufacturers of the North must operate to a greater or less extent in other sections of the country. It was stated at the convention of the iron-masters at Pittsburg, in November last, that the cost of pig-iron sold in that market, for labour alone, was $22 50 per ton. The convention of iron-masters at Baltimore estimated the cost of Maryland charcoal iron at from $22 00 to $23 00 per ton. In that calculation, the interest of capital and cost of incidentals and repairs are not included, nor the cost of transportation from Baltimore to the markets at the East.

Of thirty-one furnaces in Maryland, eleven have stopped within the last two years, and five more have discontinued mining operations.

Two furnaces in New Jersey, with a fixed capital of 200,000 dollars, both making charcoal iron, and having on hand 3500 tons of pig-iron, have been stopped this spring. All the hands have been paid off and discharged. All wood-cutting and ore-digging has ceased, and, to use the language of

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the owners, "the whole works are stopped for ever, unless a new tariff is obtained."

A few furnaces, favoured by extraordinary advantages of position, or the control of large capital, may be able to struggle on. But if the present state of things continues, the manufacture of charcoal iron must be entirely suspended, and that of anthracite iron greatly diminished. We cannot estimate the diminution of production the present year, from that of 1848, at less than 400,000 tons.

The prosperity of certain rolling-mills making merchant iron, spikes and nails, may seem to conflict with the statements which we have made in regard to the low condition of the iron trade. But many of these establishments, having large capitals, prosper at the expense of the makers of pig, bar, bloom, and scrap-iron, of whom they purchase stock at ruinous rates to the sellers. The loss falls on the worker of the raw material and producers of the coarser iron, who are generally men of small means. For instance, the maker of blooms in the counties of Clinton and Essex, in New York, having only a capital of from two to five thousand dollars invested in his forge, is obliged to sell each week's production of iron at any price the rolling-mill master chooses to pay. The owners of the small forges, doing their own labour, will continue for some time to work for a mere subsistence, in preference to abandoning the business. If they have large stocks of coal and ore on hand, they will work even at a great loss to save themselves from bankruptcy. The average cost of making blooms in those counties, the last summer, at ordinary rates of labour, was forty dollars a ton. The price now paid the rolling-mills is thirty-two dollars a ton. The difference of price showing either a loss or a diminution in the price of labour of twenty per cent. Mill bars made in the bloomeries in Essex County cost forty-five dollars, delivered at Troy. The highest offer which has been made in Troy for mill bars, this spring, is forty-three dollars per gross

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ton, on six months. It is evident, if this state of things continued much longer, the production of this variety of iron must cease. On the river Ausable alone, there are at least eighty forge fires employed in making bloomery iron.

It is evident that the rolling and nail mills, which prospered last year, must meet with a reverse. All the iron stores in New York are full of nails. Prices, which last year were as high as four cents, are reduced this spring to 3½ cents per pound.

Let us suppose that the ratio of our consumption of iron should not continue to increase, and that we should continue to require only 100 pounds of iron for each individual of our population, and this amount will be required, unless we make a retrograde movement in all the industrial arts, with a diminished production at home of 400,000 tons, we must send abroad for the immense supply of 600,000 tons.

It is said, that the consumer has only to follow the natural laws of trade, and buy in the cheapest market. But we must first consider how we shall pay for this vast import, even in the cheapest market. We must do it at a time when our power to consume and pay for our consumption is least, for this, as we shall hereafter show, is in proportion to our own production. We are best able to import iron and pay for it when we are producing it at home to the best advantage. Even now, while our merchants are taxing all their energies to increase their exports, they have to provide for their balances by sending abroad government and state stocks and railroad bonds, which are yet to be paid. Our California gold, which is now keeping the country from commercial ruin, must soon follow. At the present low price of iron, one-quarter of the value of our great article of export, the cotton crop, must go for the payment of this iron. With the prices which prevailed in 1846, these 600,000 tons of iron, calling one-half bar and the other half pig-iron, would cost $45,000,000, and would require nearly the whole export of cotton, taking the average product of the crop exported

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from 1842 to 1848, which has been estimated, upon good authority, at $50,000,000. The commercial distress which we have suffered in past years from excessive imports, without means of payment, should warn us of the ruin which is sure to follow in their train.

The consumer, who thinks of getting his supply iron in the cheapest market, should remember that instead of having the surplus iron of the British manufacturers forced upon him at his own price, as is now the case, when the competition of of our own production is withdrawn, he must seek it in their market, at their own price.

Notwithstanding the extraordinary resources of the British iron-master, any increase of demand in England is met with great difficulty. In the year 1834, the price of bar-iron in England was 6*l*. 10*s*. per ton. But in the years 1836 and 1837, Parliament passed seventy-seven railway bills, the length of the lines sanctioned being nearly 1200 miles, which called for a production of 500,000 tons of iron. The effect of this was to raise the price of iron, in 1836, to 11*l*.

In the year 1846, there was again a vast demand of iron for the construction of railroads, 593 miles being opened in that year, and 839 in 1847; at the same time, works of internal improvement were carried on in other parts of Europe, and the whole continent pressed upon Great Britain for iron. The effect was, that the price of iron was nearly three times that which prevailed in 1843, when 46 miles only of railways were opened. With the troubles on the Continent, the demand from that quarter ceased. The railroad mania in Great Britain subsided, and prices fell to their present unprecedented rates.

The effect of increased demand in England is not so much to increase production as to enhance prices. The reason for this is shown in the following extract from a report on the iron manufacture of Great Britain, read before the British Association in 1846:—"A great obstacle to the sudden increase in the production of iron is offered by the difficulty of

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procuring skilled labour. Any addition to the number of coal-miners can be made only by slow degrees, and the same condition applies to all other classes of persons whose labour is required for the manufacture of iron. It is hopeless to stimulate the exertions of the persons already employed. They are naturally ready enough to exact higher rates of wages when the demand for their labour becomes more urgent; but, succeeding in this, they prefer to obtain the same amount of earnings with higher rates of wages, to the securing of greater gains by the exertion of even the same amount of toil, so that a greater urgency in the demand may be, and frequently is, accompanied by a lesser production."

It being manifest, from the above facts, that an urgency of demand of iron in Great Britain, produces a vast increase of price, we can readily see, that if the demand in this country for English iron should be in proportion to our diminished production, the prices of iron, to the consumer here, must be greater than they have ever been before; while, if the present system of revenue continues, the price will be enhanced by a proportionate increase of duty.

It may be said that this will be remedied by the revival of production at home; but, in the mean time, all the capital in the works suspended will have been lost. The works will have deteriorated or fallen to ruin, which they do much much more rapidly when not in use. A year or more of time is necessary to make repairs, and provide the stock necessary for commencing the work anew. Workmen have become scattered, or engaged in new employments, and have lost their skill. That machine-like regularity of administration, by which alone a manufacturing establishment is profitably conducted, has to be acquired anew. Every manufacturer knows the ill effects of only a temporary suspension of work. Messrs. Cooper and Hewett say that a suspension at the Trenton works, for only four months, increased the cost of making rails on a new order, from loss of skill, at least $10 00 per ton.

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All these losses of ill-conducted labour fall upon the consumer, and he will learn that the boon of cheap foreign iron, for a year or two, when the industry of the country is paralysed and he has no means to pay even for a cheap material, is a poor compensation for the loss of that regularity or progressive diminution of price produced by healthy competition at home.

We are supposing, however, a state of things which will never occur. The deficiency of our own production will not be supplied by importations. The destruction of our production will also be that of our consumption. The construction of our railroads will be stopped, the machinery of the farm and mill will diminish, and we shall sink in all those arts which give nations their position in the scale of material civilization.

The history of the iron trade shows that while the progress of production is checked by the abolition of protective duties, there is not a corresponding increase of importations. In other words, the whole consumption diminishes.

From the statistics collected by Mr. Carey, it appears that the value of iron imported and paid for, increased from 1830 to 1834, under the protective tariff of 1828, rising from $5,900,000 in 1830, to $8,500,000 in 1834; that it diminished in the free trade period, between 1834 and 1841, reaching the lowest point in 1842–3, being then $5,500,000. Thenceforward it rose, and in 1846–7, under the operation of the tariff of 1842, there was an advance of 50 per cent., the amount imported being $9,000,000.

The effect of the protective system on consumption is shown by the facts, also cited by Mr. Carey, that under the protective tariff of 1828, the total consumption per head increased in four years fifty per cent., having attained from 42,000 to 200,000 tons. Under the system which prevailed from 1832 to 1842, the consumption was almost stationary. Under the tariff of 1842, the consumption increased from 39 to 100 pounds per head.

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The effect of the low duty upon present consumption is no less remarkable. From the number of furnaces known to have stopped, we may safely estimate that the production of 1849 must have diminished at least 100,000 tons. But during the past year we have imported 292,000 tons. It is an error to suppose that the whole import is added to the consumption of the year. A large part of the iron imported during the last year remains in the first hands in the cities. It is said that one house in New York has on hand a million dollars worth of Scotch pig-iron. Another large portion has been purchased by the foundries, who have been tempted by the extraordinary lowness of price to purchase more than they can use. This iron therefore remains at the foundries in its crude state, and does not go into consumption. One foundry in Massachusetts had on hand last winter four thousand tons of Scotch iron, two years' stock. That our market is completely glutted with foreign iron is conclusively shown by the fact that at the last quarterly meeting of the British iron-masters, a reduction of make was agreed upon on account of the reports received from this country of the overstocking of our market. When we look at the immense stocks piled at the furnaces in this country, for of the furnaces within our own knowledge, whose annual production is fifty thousand tons, twenty-five thousand tons are now piled in their yards, we can safely estimate that an amount of iron equal to the whole importation of the last year, remains unconsumed. The consumption of our population for this year has therefore been reduced from 100 pounds to 64 pounds per head. The effect, therefore, of the present system of revenue, must inevitably be to increase the price of iron, by which the consumer suffers, or to diminish the consumption, by which the whole industrial prosperity of the country is checked.

The benefit which the consumer will derive from encouraging the domestic production of iron, can be shown by many other considerations. The inventive talent of this

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country, stimulated by remunerating prices to the manufacturer, will create improvements and a healthful competition, which will have a great effect in diminishing the cost of iron. A familiar and most instructive illustration of the benefit which the consumer derives from these causes, is exhibited in the reduction of the price of nails, the form of iron in most universal use. This article has been entirely supplied by American manufacture, from the superiority of our raw material and the circumstance that in this case the excellence of the material can be at once seen by the consumer. American competition and improvements have reduced the price of cut nails from 6⅛ cents per pound, the price in 1839, to 3½ cents, the present price.

The manufacturers of iron in this country have been charged with making slower progress than other manufacturers. This, if true, could be accounted for by the short period that they have been able to work with profit, and the vast expense of new machinery and improvements. The alteration of a furnace demands the suspension of the work of an establishment for months. Material improvements would in many cases require the reconstruction of the whole works. The immense strength required for machinery in iron making, and the large scale upon which the work must be conducted, that it may be done with profit, make experiments in iron making more expensive than in any other branch of manufactures. Where the machinery is light, as in the cotton factory, and the product is increased simply by multiplying the number of small machines, experiments and improvements are made with comparative simplicity and rapidity.

A large capital is required to make experiments in the iron manufacture; and when all the receipts of the iron-master are required to keep himself from bankruptcy, he has no means to incur the vast expenditure required for improvements. He is obliged to economize, by sparing all outlay and by diminishing the price of labour, instead of

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exercising that true economy, which consists in increasing the perfection of machines, by which the employment of mere physical human force is diminished, and skilled and better paid labour is employed. Let the manufacturer have fair profits and remunerating prices, and improvements will rapidly take place, for there is no industry which is so much improved by prosperity. The successful establishment will cause another to spring up at its side with increased facilities for production. A healthful competition will stimulate the manufacturer, who will get fair profits at the same time that prices are kept within proper limits. The very profits of the manufacturer will be applied for the benefit of the consumer. An extended observation will show that the profits of nearly every manufacturer in this country are absorbed in extending and improving his works. Every improvement or better application of labour is a benefit to the consumer. One large manufacturer of iron in New England, who has been constantly and profitably employed until the present time, and has spent most of his profits in expanding his establishment, says, that within ten years, by the improvements he has made, he has reduced the cost of making railroad axles two cents per pound, and that of hammered bar-iron, one cent per pound, while the price of pig-iron has remained the same, and that of combustible has increased. Here is a diminution of twenty per cent. in the cost of making hammered bar-iron, which the consumer has gained by the prosperity of the iron-master.

But let us look more minutely at the progress of our iron manufactures, and see what we have done in this country under the stimulus of prosperity produced by the tariff of 1842. Within that period, the manufacturer of anthracite iron has received its great extension. The production of anthracite iron has been increased from six to over twenty-five tons per day, one furnace having actually made one thousand tons of iron in five weeks. We do not mean that this increase has been realized in all the furnaces, but this

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capacity of production has been demonstrated. Within this period, namely, in 1844, anthracite coal has been successfully applied to puddling and reheating iron. These various uses of anthracite coal have had a great effect in cheapening iron. In 1846, the cost of making rails in Trenton was $75 00 per ton. In 1849 it was reduced to about $50 00. In the charcoal furnaces the daily production has been increased from four or five tons (which was considered excellent work before 1842) to ten, and in one case fifteen tons in the same furnace. In hammering iron such improvements have been made in some establishments that two hammersmen and two heaters will do as much work as eight hammersmen and eight heaters did eight years ago. In the Catalan forges, by the use of gas for deoxidizing ores and reheating, and improved modes of separating the ores, the cost of the iron has been reduced twenty-five per cent. The adoption of these improvements is by no means universal, for the reasons I have before given, but will be sure to follow from the revival of the prosperity of the iron trade.

These are but few out of many illustrations which could be brought. But a vast field is still open for improvement. The metallurgy of iron is yet in its infancy. Let our manufacturers have their own market and steady prices, so that their efforts may be uninterrupted; let them have some prospect of reward for investing talent and capital in experiments and improvements; let them have means to get information from abroad, and to bring the aid of science at home to perfecting their art, and in a few years we may, like our great rival, defy the world. We have full faith in our own inventive talent, and may yet do as much for this art as was done in England by Dudley in first applying mineral coal, Huntsman in the invention of cast-steel, or Cort in inventing the puddling and rolling of iron—inventions which, like that of the steam-engine, are epochs in civilization. But let us have the protection which these men and their followers had while perfecting their inventions. By the increased cheapness of

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his product, the iron-maker will soon pay back to the consumer the tax, if any, which for a short time he may pay for his benefit.

Another important consideration to the consumer, is the actual benefit which he derives from being induced to buy American instead of British iron. The superiority of American over British iron is unquestionable. A great part of the British iron is made from impure ores and sulphurous coal, and the efforts of the iron-masters are devoted, especially during periods of low prices, to increase of make, and not to perfection of quality. In many establishments, and especially within the last year or two, iron is made from old refuse cinder, which is rich in metal, but contains all the impurities, sulphur, arsenic, and phosphorus, which deteriorate the iron. Mr. Mushet, an English metallurgist, son of the celebrated David Mushet, says that common Welsh bars do not contain more than ninety per cent. of iron. "We often hear," says he, "of extraordinary makes of pig-iron, as to quantity, but never hear at any work that bar-iron has been produced equal in quality to foreign marks; on the contrary, the general quality of British iron is much lower than it was twenty years ago." We have before us a letter from a former manager of iron works at South Wales, addressed to parties in this country, requesting employment as an inspector of rails. We make the following extract in proof of the above position: "In consequence of the *increased quantity of inferior materials* now used in the manufacture of rails, it becomes the more important that foreign purchasers should employ an inspector who is thoroughly acquainted with every process in iron making, whose business would be to secure them from defective rails, and secure a quality of iron possessing undoubted durability."

In the report of the Chief Engineer of the Virginia and Tennessee Railroad, eight dollars per ton is set down as the usual allowance for the superiority of American railroad iron. Charcoal pig-iron made in Woodstock, New Bruns-

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wick, from ores which abound in the State of Maine, has been sold in England for thirty dollars a ton, a higher price than their bar-iron commands there. Mr. Mushet, whom we have before quoted, remarks, in the April number of the London Mining Journal, while speaking of the importance of introducing the charcoal iron of Nova Scotia into Great Britain: "This iron would supersede the common iron, at present in use, for many purposes of machinery, for ordnance and firearms, for steam-boilers, for wire iron, for anchors and cables, for axles of locomotives, for wheels and wheel tires, and above all, for railway bars, it being *an indisputable fact, that the best charcoal iron rails will endure more traffic, without wearing, crushing, and laminating, than from four to five sets of coke iron rails; so that the former would prove the more economical even at four times the price of the latter.*"

The superiority of American iron, and the improvement in its quality within a few years, is strikingly exhibited in the following letter, a copy of which we have obtained at the Navy Yard at Washington.

Navy Yard, Washington, January 16th, 1844.

SIR:

In obedience to your order, I have prepared the annexed table, showing the breaking strain of chain cable-iron, 1½ inch, when tested, and by whom furnished:

By whom furnished.	Year in which the tests were made.	Breaking Strain.	By whom furnished.	Year in which the tests were made.	Breaking Strain.
Penfield & Taft,	1830	432	New Jersey Company,	1831	596
do.	1830	550	do.	1831	531
Jackson & Son,	1832	514	Messrs. Ellicott,	1839	575
Webster & Company,	1839	730	do.	1839	596
do.	1839	665	do.	1839	636
do.	1839	677	Tredegor Iron Company,	1839	574
New Jersey Company,	1839	629	do.	1839	663
do.	1839	699	do.	1839	659
do.	1839	699	Church & Scoville,	1840	641
Thomas Hunt,	1842	700	do.	1840	687
do.	1842	728	do.	1840	671

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By whom furnished.	Year in which the tests were made.	Breaking Strain.	By whom furnished.	Year in which the tests were made.	Breaking Strain.
Thomas Hunt,	1842	664	Oliver Ames,	1842	600
			do.	1842	730
E. S. Ellery & Brother,	1842	536	Andrew Gregg & Co.,	1842	681
do.	1842	610	do.	1842	786
do.	1842	642	Tredegar Iron Company.	1843	750
Oliphant & Son,	1842	599	do.	1843	736
do.	1842	601	do.	1843	716
do.	1842	614	Robert Kilton,	1843	688
Mr. Elmore,	1843	719	do.	1843	635
do.	1843	784			
Messrs. Ellicott,	1843	786			
do.	1843	750			

Very respectfully,
Your obedient servant,
JAMES TUCKER.

Captain B. KENNON,
Commandant.

We learned at the Navy Yard, that for several years, until the American iron improved, a piece of English chain cable-iron, called by the workmen the "bully" piece, $1\frac{3}{4}$ in diameter, broke American cable iron $2\frac{1}{8}$ in diameter. The English chain cable-iron was ruptured by a breaking strain of 716, less than that of American $1\frac{1}{2}$ inch iron, as appears by the preceding table. The American $2\frac{1}{8}$ inch iron, in 1841, required a breaking strain of 1277 pounds. The breaking strain of the best French cable of the same size was 1081.

A similar superiority and progressive improvement in quality, is shown in the American charcoal foundry iron, used for ordnance.

From the reports of Major Wade, a scientific metallurgist, made to the Ordnance Bureau, it appears that, from 182 trials made of iron from gun-heads, at different foundries, in the years 1846 and 1847, the mean tenacity of the iron was determined to be 28,640. Density 7·240. The mean of 86 trials, in 1848 and 1849, showed a tenacity of 30,310 and

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density 7·258. Trials made at South Boston, in March, 1850, showed a tenacity of 34,689.

Experiments of Mr. Alger show the tenacity of Scotch iron to be less than half of American charcoal iron. The superiority of the American gun-metal over the English, it is said would give a marked advantage to us in naval engagements.

We have obtained from Mr. Cyrus Alger the following memorandum of experiments made upon cast-iron at the South Boston Foundry.

	Density.	Strength.
Mean of three specimens cut from old oil-presses made from Cupola Furnace, of common foundry iron, - - - -	7·060	15220
Mean of three specimens from the South Boston Iron Company's gun-iron, - -	7·258	33738
Pig-iron from West Stockbridge Furnace, Massachusetts, charcoal, - - -	7·260	23372
Pig-iron from Briggs's Iron Company Furnace, Lanesboro, charcoal, - - - -	7·079	19432
Pig-iron from Richmond Furnace, Massachusetts, charcoal, - - - - -	7·144	18570
No. 1 pig-iron, from West Stockbridge, made from half American ore, and half Cornwall ore, - - - - - - - -	7·094	16913
Same, No. 2 iron, - - - - -	7·186	13374
Briggs's Iron Company, No. 1, pig, - -	7·106	18505
Scotch Gartsherrie pig-iron - - -	7·016	11535
Scotch Lugor pig-iron, - - - -	6·932	10251
Mean of three specimens of anthracite pig-iron, - - - - - - - - -	7·147	14870
Old navy guns made at Georgetown, 1820–3,	7·166	22980
Old navy guns made at West Point, "	7·187	26220
Mean of thirty-five 24-pounder howitzers, made in 1849, at South Boston Foundry,	7·305	36650

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When we consider that iron is the material upon which the strength of most mechanical constructions depends, that we are constantly trusting our lives and property to our faith in the strength of a bolt, bar, or chain, we may see that it is a matter of the utmost consequence that the best material should be used. It may be said that the marked superiority of American iron is in itself a sufficient protection; but this is not so. The consumer has rarely the means of judging the quality of iron before he purchases. Even among our educated engineers the knowledge of the qualities of iron is very limited. In this country, railroad axles are made from Salisbury iron, of which M. Leplay, the most distinguished French metallurgist, says, "This iron is placed by its tenacity in the first rank of all known varieties of iron." Yet a difference of one cent per pound, induces many of our railroad companies to prefer the vastly inferior English iron. Our foundries are every day casting the weak Scotch iron into stoves and culinary vessels, and distributing them among the farmers, who never inquire, and have no means of learning, of what a worthless material they are made. The axles of the farmer's cart break down, under a heavy load, upon the road, and he loses in time and costs of repairs ten times the sum which he would have paid for good American iron. The chain cable parts, and the ship is lost on a lee shore; but neither the farmer nor merchant are able to follow the iron from the shop through successive workers and dealers, until they learn the origin of the material which has caused their misfortunes. The quality of iron cannot be judged by inspection. Its defects are not known until some accident, involving, perhaps, the loss of life or limb, reveals them. The consumer trusts to the merchant, and he, perhaps, to the foreign manufacturer. What is the remedy for deception? Let the producer and consumer be brought as near as possible together. The farmer knows minutely the qualities of the iron made in his neighbour's forge; the

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nearer he is to the producer, the less liable he is to mistakes or deception.

The opportunity for deception is probably greater in the sale of iron than in any other article of merchandise. We are informed, upon reliable authority, that a quality of iron marked in Stitts, Brothers' price current of Nov. 10, 1849, "G. D. P. Blaenevon, cable iron, price 6*l.* 7*s.* 6*d.*," is largely sold by the trade for a quality marked "Best Bar Iron, B. B. H., Stitt & Co., price 8*l.*" In one case a large fortune was realized by this *substitution*, and others of the trade were compelled to adopt it in self defence.

Even the government does not escape receiving poor iron for public purposes, especially for the use of the navy, where the best qualities are demanded. It is true the contracts specify that the iron supplied must be of American manufacture. Under the present injudicious law, so much complained of by the commissioners of the navy, requiring the government to take the lowest bids, the contractors are tempted to furnish inferior iron, particularly at a period of low prices and poor profits. In some cases, iron has been furnished at the navy yards, at prices for which no American iron could be made, and therefore must have been of British manufacture. Such consequences as the following are the result. A few months since, the Hetzel steam-vessel, employed on the coast survey, went ashore at Cape Carnaveral, in a fresh breeze, "from a defect in a chain cable." By this accident the whole hydrography of Key West has been delayed for a year.

In France, government requires that all rails, before being laid down, should bear certain tests, and railroad axles and the tire of driving-wheels of locomotives are required to be made of charcoal iron manufactured in a prescribed manner. Our government has no power to make these wholesome restrictions, but the same result would be accomplished by adopting a system which would make it a matter of direct

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pecuniary interest, as it is unquestionably of remote interest, for railroad companies to use the superior American iron.

The present system of revenue directly encourages the use of poor instead of good iron. The British manufacturer, paying less duty upon the poor article, finds it for his interest to make and export the cheapest and poorest iron as long as he can find a market for it; he will have broken down his rival in this country, before the worthlessness of his material is discovered by the consumers.

Having, as we believe, proved that the American consumer of iron, even if we could separate his interests from those of the producer, is benefited by the protection of the American iron-master, we have yet to consider the direct benefits derived from the development of this industry upon our own soil.

We estimate the quantity of iron made in the year of our greatest production at 800,000 tons. The cost of this as pig, without reckoning the interest of capital, cannot have been less than $20 a ton, delivered at market. From this we may deduct $2 a ton as the value of the raw material used—the wood, coal, and ore—and nearly the whole of this value is lost when iron-making ceases; and the remaining $18 have been paid for labour in wood-cutting, coal-burning, and mining coal and ore, furnace-work, and transportation of materials. The average price paid for a man's labour may be set down at $1 per day, much of the labour being higher and some lower. We have then 48,000 able adult men constantly employed. Each of these men has an average of three persons dependent upon him. We have, therefore, 192,000 persons directly supported by the manufacture of pig-iron alone. To convert half this pig into bar-iron of all kinds, railroad, common, refined, hammered, boiler iron, &c., would cause a loss of perhaps 25 per cent. on the pig, and a cost of at least $30 a ton on 300,000 tons, making $9,000,000. This sum, being the cost of fuel obtained principally from our own soil, manufacture, and transportation, is, in fact, all paid

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for labour, employing 30,000 more adult men; and thus a further number of 120,000 individuals is wholly supported by the iron manufacture.

In this estimate no account is taken of the farther manufacture of this material by the mechanics and workers of iron, blacksmiths, founders, machinists, &c., for they may be employed upon foreign as well as American iron. But if the consumption of iron is increased 30 per cent. by the successful production at home, as we have before shown, then there are 300,000 tons more worked up when our industry is protected and flourishing. At the very moderate sum of $30 a ton for the labour employed in working up this iron, the extra sum of $9,000,000 is paid for American labour, giving support to 120,000 individuals more. We had therefore, in the year of our greatest prosperity, 432,000 persons, or a forty-sixth part of our whole population, directly supported by the establishment of the iron business on our own soil.

Let us take another view of the importance of this manufacture, and look at our production of iron as a subject of transportation. The importance of the cotton crop in this view, as it employs so many of our freighting ships, is obvious at once. From 1842 to 1848 inclusive, the cotton crop averaged 2,060,000 bales. The weight of a bale of cotton is not far from 500 pounds. The weight, therefore, of our whole consumption of iron in 1848 was nearly double that of the whole cotton crop. To transport our whole production across the Atlantic would have required 800 ships of five hundred tons burden, making two voyages a year. This immense burden must therefore form a most important item of freight for the railroads, canals, and steamboats of the interior. It is said that our railroads cannot be extended unless we can obtain cheap British iron. The successful American production of iron is of more consequence to the railroads than the cheapness of British iron. Let us suppose that each ton of iron made in the interior is transported upon a railroad 50 miles,—and it is upon the railroad lines that the iron esta-

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blishments spring up, each seeking the other,—and that it pays a freight of $1 a ton; the increase of passenger freight and the general activity of trade would probably add half as much more for each ton of iron made:—the amount of freight produced by the manufacture of American iron is then $1,200,000. Now, if a specific duty of $20 a ton were placed on British iron, even if the whole of this duty were added to the price, which would not be the fact, the freight derived from the production of American iron would give the railroads the means of paying each year the additional duty on the iron for over 500 miles of new lines.

These are the direct advantages which the country derives from the production of iron: but they are not all: the producers and transporters of iron are in their turn the consumers of the products of other labourers, and particularly of the farmer, for whom they make a market at his very door.

We submit the following authentic report of the quantity of agricultural products consumed at a furnace in New York making 3,000 tons of iron per year:

195 5/20 3/20 tons of hay, $8 86	$1,730 07
3,484 bushels of corn, at 75 cents	2,613 00
281¼ bushels of rye, at 76 cents	213 75
72⅝ bushels of beans, at $1 17	85 22
1,290 bushels of peas and oats, at 50 cents	645 00
569 bushels of wheat, at $1 28	728 32
407½ barrels of flour, at $6 26	2,550 95
1,000 bushels of shorts and fine feed	192 50
111 barrels of pork, at $14 61	1,621 71
10,628½ pounds of pork, at 6 cents	637 71
424 pounds of lard, at 9½ cents	40 28
13,516 pounds of beef, at 4⅘ cents	594 70
7,008½ pounds of butter	1,058 57
Amount carried forward	$12,711 78

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Amount brought forward - - - - -	$12,711	78
Grain fed to teams abroad - - - - - - - -	17	08
Cost of transporting part of above - - - -	317	41
250 pounds of clover seed, at 9½ cents - - -	27	75
5½ bushels of timothy grass seed - - - - -	19	25
Garden seeds - - - - - - - - - - - - -	4	00
Crackers - - - - - - - - - - - - - -	12	00
1 barrel of cider - - - - - - - - - - -	2	00
23 bushels of onions - - - - - - - - - -	17	18
Eggs - - - - - - - - - - - - - - -	23	17
1,760 pounds of hides, at 4 cents - - - - -	70	40
1,590 pounds of tallow, at 8 cents - - - -	127	20
1,500 bushels of turnips, at 12½ cents - - -	187	50
1,335 bushels of potatoes, at 50 cents - - -	667	50
281 bushels of apples - - - - - - - - -	61	50
1,530 pounds of dried apples - - - - - -	64	20
32 sheep, butchered cost - - - - - - - -	41	00
4 Turkeys - - - - - - - - - - - - - -	2	00
Sundries - - - - - - - - - - - - - -	10	44
Various articles of agricultural produce estimated to have been used by jobbers, iron-drawers, &c., which did not pass through the hands of the furnace owners, and sundry articles of produce taken into the store and paid for barter, of which no account was made - - - - - - - - - - - - - - - -	1,616	64
Total - - - - - - -	$16,000	00

We see, from the foregoing statement, that for each ton of pig-iron produced, the sum of $5 33 has been paid to the farmer for his products. Taking this as an average, the manufacture of pig-iron alone, when prosperous, furnished the farmers a home market for over four million dollars' worth of agricultural product. In the above account, however, no mention has been made of the produce consumed

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by the labourer from his own land, nor of the cotton, sugar, rice, and tobacco, the productions of the planter, neither of articles of clothing, furniture, and building materials, the product of the manufacturer and mechanic. In fact, we shall find that each producer of iron has been a consumer to the whole extent of his production, and that his production has alone given him the power of consumption. The greater portion that the producer of iron has received for his labour has been expended for the daily support of himself and family, thus supporting at the same time the farmer, planter, manufacturer, and mechanic. The remainder he has invested for his future necessities. If he has invested it in building a house, in the improvement of his land, or the stock and tools on his farm, or if he lends it to his neighbour for the same purpose, he equally consumes, or causes to be consumed, the products of the farmer and mechanic. It is the same if he places it in a savings bank, which lends it to the owner of the factory or the railroad company, thus increasing the consumption of cotton or iron.

The influence of the industry of iron upon the prosperity of an agricultural people will be better seen by taking a closer view of the actual operations of an iron establishment. We will take the case of a charcoal furnace and forge of the North. The location of the establishment, for obvious geological reasons, is in an interior position, remote from the great markets, and in a country whose mountainous surface offers a scanty return to the labours of the husbandman. The erection of iron works is determined upon. An idle stream is dammed up, and forced to the aid of human industry. A sawmill is erected. Timber, which would not bear transport to a distant market, becomes suddenly valuable. The worthless clay and sand are converted into bricks. Building stone is quarried and hauled. The neighbouring farmers find constant employment for themselves and teams during the intervals of their farming labours, in the coarser mechanical work, or in the transportation of materials. The

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store and boarding-house are built. The workmen abstracted from farming pursuits must be fed. A market is found for the surplus products of the farm,—for milk, potatoes, hay, and all vegetables which could not be carried to a distant market. The regular work of the furnace and forge commences. The young men, who must earn the money to buy their farms, find constant employment at the fire or hammer. But the greater portion of the labour must still be performed by the farmer. The winter, which he had before spent in comparative idleness, doing little more than feeding his stock and getting in his firewood, becomes the busiest season. This is the best time to transport ore and wood to the furnace, and iron to market. Three or four cords of wood must be supplied for every ton of iron made. He cuts and hauls this wood, and thus receives wages for clearing new land for his crops, whereas, before, the trees were felled and burned up upon the land at a great expense. From these various employments he soon derives means to improve his instruments of labour. He gets a better team, puts iron tires and axles to his carts, has new chains, bars, picks, and ploughs, to use on his farm, and stoves for diminishing the labour of his household. For these he has only to exchange his labour, without payment of a tax or profit to the merchant and carrier. Constant occupation of his time doubles the products of his hands, and the market at his door quadruples the value of his land.

The increase of the material prosperity of the country is not the only result achieved by well-employed and rewarded labour. Newspapers, books, schools, churches, are the investments of the surplus products of the labourer. With the prosperity effected by the production of wealth, spring up the desire and effort to extend its blessings among the unfortunate. We can point to a small iron manufacturer in Connecticut, who has devoted all the profits of a small furnace and farm, in and upon which he labours every day with his own hands, to feeding, clothing, and educating, at his own

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house, ten or twelve orphan children, whom he has rescued from poverty and crime, and is training to be Christian teachers and missionaries.

Although the production of iron has added so immensely to the wealth and prosperity of the whole country, what is the present condition of the manufacturers and owners, through whose enterprise and skill this industry has been developed? If they have made money in a short period of prosperity, it has been nearly all absorbed in their works, and is now lost, with their original investments, by the ruin of their business. Estimating the fixed capital required to make 3,000 tons of pig-iron, annually at $50,000, an estimate far within the truth, the diminution of production in this country, unless the business should be revived, has caused to the manufacturers of pig-iron alone a direct loss of nearly seven millions of dollars. One rolling-mill in New York, most favourably situated, which cost over $250,000, was sold a few months since for $30,000. Another, in Boston, which cost $282,000, was sold last fall for $146,000. The amount for which each was sold being simply the value of the land connected with them, for building purposes, and of the machinery as old iron. An equal, if not greater, depreciation could be shown to have taken place in the value of every other rolling-mill in the country. The furnaces and ore-beds of course are entirely worthless, if the manufacture of iron is not revived. The revenue from iron, for the last two years, has been less than five millions of dollars. We may, then, safely say that every dollar of revenue which the government has received from the duty on iron under the present tariff, for the last two years, has displaced an equal amount of American capital employed in domestic production. And yet the Treasury gained, during the last year, under a system involving this tremendous loss to the country, only $341,920, more than it received from the duties on iron in 1845, under a policy which built up American furnaces as fast as the present destroys them. It is probable that the

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commercial history of the world cannot present a parallel instance of the destruction of so important an industry, not by war, political revolutions, or the act of God, but by the voluntary act of the government which should have fostered and sustained it.

These fatal results, although doubtless unforeseen by those who established the present tariff, are the direct and legitimate consequences of the colonial system which Great Britain has succeeded in fixing upon us, through the aid of her delusive and selfish political philosophy. When we were colonies, in 1750, Great Britain prohibited the erection of rolling and slitting mills in America, upon the representation of her iron-masters, that they would "interfere with the manufactures of Great Britain," quoting the language of their memorial. Lord Chatham afterwards declared that he would not allow the colonists to make a hobnail for themselves. And now, as soon as our manufacturers, crushed by this very colonial system, which has again been fixed upon us, meet in conventions and ask Congress for relief, the British government takes alarm, and confiding in the filial attachment of our legislators for the mother country, and in the dutiful respect for her opinions, instruct their minister to tell us, that an increase of duties on British iron, or, in other words, the protection of our own industry and the revival of our own ruined works, will "press heavily on British productions," and would produce a very disagreeable effect on public opinion in England. The very argument, and almost the very language addressed, in 1750, to the British Parliament by the British manufacturers, is addressed, in 1850, by the British minister to the American government. It would seem that even the lapse of a century has not changed our relations of dependence upon our former mistress.

It is said that a duty of 30 per cent. ad valorem, with the cost of transportation, ought to be a sufficient protection. But the facts show that it is not. The present ad valorem duty is no protection, either to the producer or consumer,

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against the extraordinary fluctuations in the prices of iron abroad. The fluctuations in the price of bar-iron within ten years, has been from 4*l.* 10*s.* to 15*l.* Where the manufacture of iron, as in England, depends largely upon a foreign market, the price is affected by all the wars, revolutions, political excitements, famines, or speculations which prevail abroad. Nature has placed a barrier to defend us from the political convulsions of Europe; why should we break it down and subject the springs and streams of American industry to be disturbed by every convulsion in Europe, as truly as were our natural fountains by the great earthquake of Lisbon?

The British manufacturer has advantages for which we need compensation. The greater portion of British establishments, and particularly those which produce the Scotch iron, which has been imported in such quantities the last year, have advantages of location which none of our present establishments have. M. Dufrenay and E. De Beamont, in their metallurgic voyage in England, say—"The establishments in the environs of Glasgow have the *inappreciable advantages* of being placed in the centre of a coal basin, in which are found united the coal, the mineral of iron, the flux, and almost always the refractory clay necessary for the construction of furnaces." Where all the material is taken from the same mine any number of furnaces and rolling-mills can be included in one gigantic establishment, and the costs of superintendence and administration, which are borne by each one of the many works required in this country, to produce the same quantity of iron, are there limited to one. Favoured by these facilities, the Scotch furnaces are able to make iron at a cost of only 2*l.* 0*s.* 3*d.* per ton."

No localities, having all these advantages, have been improved in this country. They exist, however, and one of the benefits which will accrue to the consumer from protection, will be the development of iron establishments upon the

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coal-fields instead of upon their margins; situations which possess, in a great degree, the advantages above described.

The concentration of the iron business in Great Britain into limited districts, and within the control of comparatively a few great capitalists, enables them to make such combinations and arrangements for regulating prices, as would be wholly impracticable among small manufacturers scattered over a vast country like ours.

The following statement illustrates the control which the British iron-master can thus exercise upon prices.

In December, 1836, the iron-masters of South Wales called a meeting of the trade at Newport, and agreed to the following resolutions:

"That the make of iron be reduced 20 per cent.

"That the reduced make be persevered in till 31st March, 1837.

"That the price of iron be continued at 10*l.* per ton.

"The iron-masters present agreed to blow out twenty-two furnaces, and to meet, by a reduction of make in their remaining furnaces, the specified quantity required of them of the one-fifth proposed to be reduced, to be calculated on the make of the previous twelve months.

"The Staffordshire, Shropshire, North Wales, and Scotch iron-masters were requested to join in this arrangement, to which they acceded."

The consequence of this arrangement was that stocks were not accumulated and prices were kept up.

We need protection to enable us to compete with the great advantages which the British iron-master has in the cheapness of capital. While we have to pay six per cent. for money, and frequently much more, our competitors obtain it at half that rate. They have, therefore, twice the capacity to live in a period of depression that we have. The more wealthy iron-masters being able to hold on to their stocks during a season of low prices, while they can reduce

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the cost of labour, accumulate vast fortunes when the flood of high prices returns.

But more than all, we need protection against the competition of cheap foreign labour. The advantage which the European has in this respect is equal to the whole difference in the price of labour on the two sides of the Atlantic. For this the present duty, it will be seen, is no compensation.

The wages paid in this country for agricultural or common unskilled labour are from 75 cents to $1 00 per day; the average is about eighty cents a day. From Mr. Aiken's pamphlet on the prices of labour in Great Britain, it appears that the labourers in Scotland are paid from 24 to 36 cents a day. The labourers of the same class in England are paid from 32 to 48 cents a day. An article in the March number of Blackwood's Magazine, makes the wages of this class of labourers in England, at the present time, much lower. It is there stated, that labourers, in constant work, must be satisfied with 7*s.* or 8*s.*, and in some cases with not more than 6*s.* a week. Taking the average of the first-named prices in Scotland and England, the British manufacturer has an advantage in the employment of this class of labour, which enters so largely into iron making, of over 100 per cent.

At the Massachusetts rolling-mill the sum of $3 50 a ton was paid for the labour of puddling railroad iron. The same price for puddling has been paid in Troy this spring, and the puddlers struck for higher wages. At Canton, Massachusetts, $4 00 is paid for puddling iron for railroad tire and axles, a better kind of iron.

Mr. Crocker, a practical iron manufacturer, who has visited England during the last year, says that the iron-masters in Staffordshire paid 8*s.* per ton for the whole labour of puddling iron for wire, tin plates, and the best kinds of iron; for common iron, 7*s.* 6*d.*, and for rails, 7*s.*

A hammersman in this country receives from $2 00 to $2 25 a day. In England they are paid from 75 cents to

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